infecting fungus. In this the inner hyphae began to grow and broke through the outer layers, and on this mycelium, whose origin was clear, conidiophores and conidia arose within three days. These showed it to be a Penicillium (Citromyces) very like *P. geophilum*, and similar results were reached with Fagus. Fungi of this group were also found in the forest soil where mycorhiza of Fagus was abundant. Carpinus was not available for experiments on reinfection, but a considerable number of young roots of a two-year-old Fagus showed infection from pure cultures of the Carpinus mycorhiza, as well as from several other species of forest Penicillia.—C. R. B.

Respiration.—For about a dozen plants Mme. MAIGE has determined the amount of O_2 fixed and CO_2 evolved by the stamens and pistils as compared with an equal weight of leaf tissue, both in air and in pure hydrogen.[9] She finds both aerobic and anaerobic respiration, tested thus, to be much (2–18 times) more active in the floral organs than in the leaf; and, with one exception, more vigorous in the pistil than in the stamen, and in the anther than in the filament. These results confirm the early ones (1822) of DE SAUSSURE, as to the relative rate of respiration of the floral organs and the leaves; but DE SAUSSURE found stamens more active than pistils. For the conciseness of this paper Mme. MAIGE is much to be commended.

JENSEN[10] finds that the alcoholic fermentation of sugar proceeds by two stages and he therefore predicates two enzymes, glucose being split by dextrase (glucase?) into dioxyacetone and this by "dioxyacetonase" into CO_2 and alcohol. But in respiration, with oxidase and free oxygen present, the dioxyacetone, produced as in fermentation, breaks up into CO_2 and water, the main end-products of aerobic respiration.—C. R. B.

Transpiration.—SAMPSON and ALLEN, declaring that too little account has been taken of the effect of physical factors on transpiration, furnish further data on this subject.[11] Comparing evaporation from equal areas in equal times they find that there is little variation for plants of the same species under the same conditions of development and exposure; that of the same species the sun form evaporates 2–4 times as much as the shade form, whether the two are tested in the sun or shade, a difference which they ascribe chiefly to the greater number of stomata in the sun form (20–60 per cent.); that the increased evaporation with altitude, *caeteris paribus*, is due to lower pressure and not to differences in light or humidity; that generally acid solutions accelerate and alkaline solutions retard evaporation, but without relation to concentration; that evaporation is greater

9 MAIGE, MME. G., Recherches sur la respiration de l'étamine et du pistil. Rev. Gén. Bot. **21**:32–38. 1909.

10 JENSEN, P. BOYSEN, Die Zersetzung des Zuckers während des Respirationsprozesses. Ber. Deutsch. Bot. Gesells. **26a**:666, 667. 1908.

11 SAMPSON, A. W., AND ALLEN, LOUISE M. Influence of physical factors on transpiration. Minn. Bot. Stud. **4**:33–59. 1909.

from plants in coarse than in fine soils; and that a "bog xerophyte," *Scirpus lacustris*, loses about twice as much water as *Helianthus annuus*, on account of its loose structure, the air spaces being estimated at 80 per cent. of the total volume and the internal surface as 15 times the external.—C. R. B.

Anthocyan.—On the vexed question of the formation of anthocyan, COMBES furnishes[12] first a very clear and compact summary of the previous researches. He then demonstrated that the close relations between the accumulation of carbohydrates and the formation of anthocyan, pointed out by the researches of OVERTON and MOLLIARD on artificially nourished plants, exist also in nature, however the pigmentation is provoked. The insoluble carbohydrates behave differently, according to the occasion of the pigmentation; but the sugars, glucosides, and dextrins behave alike in all cases, the two former varying in amount directly as the anthocyan, the dextrins diminishing as the sugars and glucosides increase. The insoluble carbohydrates, consequently, appear not to share directly in the formation of the red pigment. COMBES concludes that the anthocyans, which are probably cyclic glucosides, are formed at the expense of neither preexistent sugars and glucosides nor chromogens, but arise at the same time as other glucosides, as part of the general accumulation of such bodies.—C. R. B.

Chlorophyll bodies.—Morphological distinctions between chlorophyll bodies, found in a great number and variety of plants, have been pointed out by D'ARBAUMONT,[13] who divides them into two categories, chloroplasts and pseudochloroplasts. The former, held to be morphologically superior, seem to include the bodies usually recognized under that name, without admixture of the latter, from which they are distinguished by not swelling in water (at least *in situ*), and by not being stained, with rare exceptions, by acid aniline blue. The pseudochloroplasts, on the contrary, usually swell in water and become vividly colored in the stain. They are of four types, all small, more or less varied in shape, with different degrees of green coloration, and variously intermixed. The members of the two categories are formed in the same way, either with or without the cooperation of starch,[14] and both, without reference to their mode of origin, may or may not form starch.—C. R. B.

Morphology of Symplocarpus.—In an investigation of *Symplocarpus foetidus*, ROSENDAHL[15] has obtained the following results: the primordia of the flowers

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12 COMBES, R., Rapports entre les composés hydrocarbones et la formation de l'anthocyane. Ann. Sci. Nat. Bot. IX. **9**:275–303. 1909.

13 D'ARBAUMONT, J., Nouvelle contribution a l'étude des corps chlorophylliens. Ann. Sci. Nat. Bot. IX. **9**:197–229. 1909.

14 *Cf.* BELZUNG, E., Nouvelles recherches sur l'origine des grains d'amidon et des grains de chlorophylle. Ann. Sci. Nat. Bot. VII. **13**:17. 1891; Jour. de Bot. **9**:67, 102. 1895.

15 ROSENDAHL, C. OTTO, Embryo sac development and embryology of *Symplocarpus foetidus*. Minn. Bot. Studies **4**[1]:1–9. *pls. 1–3*. 1909.